REVIEW OF AGROMETEOROLOGICAL PRODUCTS/SERVICES TO IMPROVE IMPLEMENTATION AND IMPACT. DROUGHT MONITORING, EARLY WARNING AND INFORMATION SYSTEMS

REVIEW DEI PRODOTTI AGROMETEOROLOGICI UTILI PER FAVORIRE L'IMPLEMENTAZIONE E GLI IMPATTI SULLE PRODUZIONI

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Abstract

This work summarizes the results of the task team "Agrometeorology" of the WMO RA VI WORKING GROUP ON CLIMATE AND HYDROLOGY - CLIMATE EXPERT GROUP obtained during the period 2010-1013. The tasks included the topics: a) the economic impacts of agrometeorological information in Europe; b) improve the active collaboration between the farming community in Europe and agrometerological services; c) best practices for agrometorological products; d) new challenges or tasks for agrometeorological services and products related to ongoing climate change impacts; e) use of climate and meteorological resources in the RA VI high-quality agricultural production chain.

Related to the problem of drought in agriculture in Europe several challenges were detected and recommendation developed. Challenges in research and operational application include the improvement of high resolution and tailor made forecast and monitoring of drought and heat. For example drought stress should be better related to various crop types, and consider local soil water balance conditions. For farmers the fast and easy to understand information transfer of forecast and nowcast in monitoring systems is crucial. In this context many options are nowadays available through web applications. The combination of data sources in now and forecasting is another challenge and should be forced further trough stronger cooperation between operational services and research Institutions. Specific problems may further occur through ongoing climate change impacts on the spatial shift of agro-ecological zones. Locally applied methods, e.g. used agro-climatic indicators, may need an overhaul or re-calibrated for changed local climatic conditions. Finally drought and heat will influence increasingly the whole food production chain, and specific products such as the impact of heat waves on energy supply for cooling systems could be included in operational forecasts.

Keywords: CAgM, WMO, agrometeorological information.
Parole Chiave: CAgM, WMO, informazioni agrometeorologiche.

The economic impacts of agrometeorological information in Europe.

The knowledge on economic value or impact from the use and application of agrometeorological information is an important aspect for dissemination and user acceptance of agrometeorological information and products. According to Shivakumar (2006) most countries however do not assess the economic value of the information provided. In a report of the World Bank (2010) on the economic evaluation on adaptation options to climate variability and change a recommended methodological approach can be described as "project economic analysis related to a "baseline" or "without-project" scenario. The problem of any approach, however, is an inherent subjectivity caused by human decision making and the dependence on the scale of interest(e.g. problem focused, stand alone project vs. sectorial, more generalized projects). Our survey revealed that in Europe related studies obviously are still very rare. Information on some case studies (often with just subjective assessments) are available especially in the field of agrometeorological products/services for irrigation scheduling and crop pest management, where significant cost reductions or gain increase in crop management are reported (often in the context of precision farming technologies).

Improve the active collaboration between the farming community in Europe and agrometerological services

Dunkel (2002) and Eitzinger et al. (2008) analyzed the institutional structure of agrometeorological services in Europe, where not only NMHSs are involved but in several cases also agricultural research and extension services and others. Similarly Perarnaud (2004) outlined that the way of how agrometeorological information is developed and distributed in European countries depends on how different actors in the agricultural and food sector are organized and which interest the meteorological services show within this area. Increasing importance is obviously related to the private sector initiative, which is also confirmed from other studies and surveys, such as from COST734 Action. According to these conditions and developments it seems that a better cooperation with the farmer community could be reached by a stronger involvement of local actors (agricultural extension services, agricultural schools etc.) for the dissemination as well as tailor made development of agrometeorological products. This is also relevant as weather services cannot provide the personnel resources to gather and develop local Know-How on the correct application and interpretation of products (i.e. drought indices) for decision making for the specific farmers conditions.

Best practices for agrometorological products

Challenge in research and operational application include the improvement of high resolution and tailor made forecast and monitoring of
drought and heat. For example, drought stress should be better related to various crop types and consider local soil water balance conditions. For farmers the fast and easy to understand information transfer of forecasting and now-casting products through monitoring systems is crucial. In this context many options are nowadays available b web applications. The combination of data types in now- and forecasting is another challenge and should be forced further trough stronger cooperation between operational services and research Institutions.

End users and farmers can best utilize a ready to use guidance document, which shows a brief weather forecast and crop/locality specific agrometeorologic recommendation. The temporal scale of such warnings can follow the one of the already existing meteorological forecasts. Special attention can be given to time periods of importance for the farming community, which can differ significantly between agro-climatic regions. Forecast of agrometeorological conditions is extremely important for farmers decision making in crop management. This is further highly correlated with the spatial scale of agrometeorological forecasts, which should be as high resolution as possible. NWP products of high resolution for example can serve this propose at a local level. Customization of local forecasts to the crops used locally is crucial as already mentioned in task b). The forecasts should adapt to local crop production conditions and provide custom recommendations for the area of interest.

New challenges or tasks for agrometeorological services regarding climate change and products for the whole agricultural production chain

Specific problems may occur through ongoing climate change impacts on the spatial shift of agro-ecological zones. Locally applied methods, e.g. used agro-climatic indicators, may need an overhaul or re-calibration for changed local climatic conditions. Drought and heat will influence increasingly the whole food production chain, and specific products such as the impact of heat waves on energy supply for cooling systems could be included in operational forecasts. The European approach to food production evolves towards an advanced agro-food system providing for the integration of four main subsystems: agricultural subsystem (crop cultivation and husbandry), input-supply-industry (machinery, seeds, agro-chemicals, energy, animal nutrition, etc.), agro-food-industry (primary and secondary food processes) and distribution (wholesale/retail). This new paradigm of the European agro-food system includes as corollaries, among others, (I) the full traceability of products along the agro-food chains, (II) the overall sustainability of agricultural activity, based on balanced use of resources, low environmental impact, multi-functionality, full meet of needs of food industry/consumers and rational evaluation of economic limitations. The above-described context opens a wide set of opportunities for meteorological and hydrological services able to produce high quality agrometeorological information by means of enhanced systems of measurement and modeling and to broadcast it to final users in a timely way.